IT - 314

SOFTWARE ENGINEERING

Group No - 11

Lab - 06: Point of sale system

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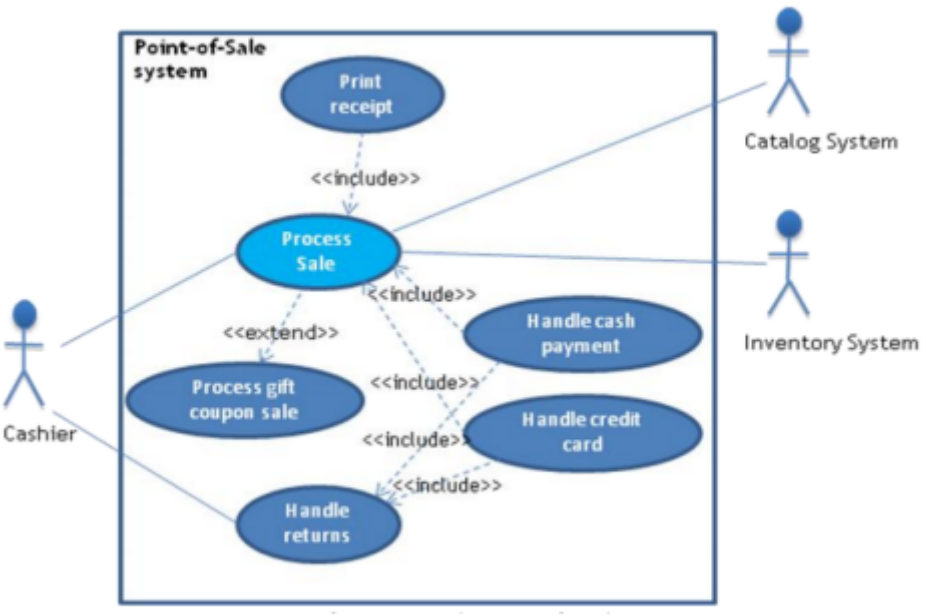
Problem Description

A POS (Point-Of-Sale) system is a computer system typically used to manage the sales in retail stores. It includes hardware components such as a computer, a bar code scanner, a printer and also software to manage the operation of the store.

The most basic function of a POS system is to handle sales. When a customer arrives at a POS counter with goods to purchase, the cashier will start a new sale transaction. When the barcode of a good is read by the POS system, it will retrieve the name and price of this good from the backend catalog system and interact with the inventory system to deduce the stock amount of this good. When the sale transaction is over, the customer can pay in cash, credit card or even check. After the payment is successful, a receipt will be printed. Note that for promotion, the store frequently issues gift coupons. The customer can use the coupons for a better price when purchasing goods.

Another function of a POS system is to handle returns.... [The details of which are not given here]

A user must log in to use the POS. The users of a POS system are the employees of the store including cashiers and the administrator. The administrator can access the system management functions of the POS system including user management and security configuration that cashiers can't do.



1. **Develop Use Case Textual Description for "Process Sale" and "Handle Return" use cases.**

- **For Process sale**

  Use Case: Process Sale

  Primary Actor: Customer, Cashier

  Stakeholders: Customer, Store Management

  Precondition: The POS system is logged in and ready for use, and the customer has selected items to purchase.

  Main Flow:

  1. The customer brings items to the POS counter.
  2. The cashier scans each item using the barcode scanner.
  3. The POS system retrieves and displays item details (name, price) from the catalog system.
  4. The system calculates the total price of all the scanned items.
  5. If applicable, the system applies any discounts, promotions, or gift coupons.
  6. The cashier asks the customer for their preferred payment method (cash, credit card, etc.).
  7. The cashier processes the payment through the system.
  8. For credit card payments, the POS system communicates with the payment gateway for authorization.
  9. Upon successful payment, the system updates the inventory, reducing the stock of the purchased items.
  10. The POS system prints the receipt, and the cashier provides it to the customer.
  11. If applicable, the system issues new promotional gift coupons to the customer for future use.
  12. The cashier hands the purchased items to the customer, concluding the transaction.

  Extensions:

  3a. If an item is not found in the system, the cashier manually enters item information or contacts the system administrator for catalog updates.

5a. If a discount or coupon is invalid, the system notifies the cashier. The cashier informs the customer and either proceeds without the discount or seeks manager approval.

9a. If payment authorization fails (e.g., insufficient funds or card declined), the cashier requests the customer to choose an alternative payment method.

10a. If the receipt printer malfunctions, the cashier troubleshoots the issue or offers a digital receipt.

Postcondition:

- The sale is completed, and inventory reflects the reduced stock.

- **For Handle Return**

  Use Case: Process Sale

  Primary Actor: Cashier, Customer

  Stakeholders: Customer, Store Management

  Precondition: The customer has the item to be returned, along with the original receipt, and the POS system is ready to process the return.

  Main Flow:

  1. The customer presents the item and the original receipt to the cashier.
  2. The cashier enters the transaction ID or scans the receipt to retrieve the sale information from the POS system.
  3. The system checks the return eligibility of the item based on the store's policy (e.g., return window, item condition).
  4. If the item is eligible for return, the system initiates the return process.
  5. The system offers options for refund or exchange based on the store's return policy.
  6. If a refund is selected, the system processes the refund (cash or credit back to the card).
  7. If an exchange is selected, the cashier scans the new item, and the system calculates any difference in price.
  8. The POS system updates the inventory, adding the returned item back to stock.
  9. The POS system prints the return receipt.

10. The cashier hands the customer the return receipt (or any refund, if applicable), completing the transaction.

Extensions:

3a. If the item is not eligible for return (e.g., beyond return window or wrong condition), the cashier informs the customer and explains the store's policy.

3b. If a mismatch is found between the item being returned and the original sale record (e.g., wrong item or serial number), the cashier investigates the issue and resolves it with the customer.

7a. If a refund processing error occurs, the cashier informs the customer about the issue, troubleshoots the problem, and offers alternative solutions.

Postcondition:

- The return or exchange is processed, and inventory is updated to reflect the returned or exchanged items.

2. Identify Entity/Boundary Control Objects

Entity Objects:

1. Sale
2. Item
3. Payment
4. Customer
5. Cashier
6. Inventory
7. Coupon
8. Return

Boundary Objects:

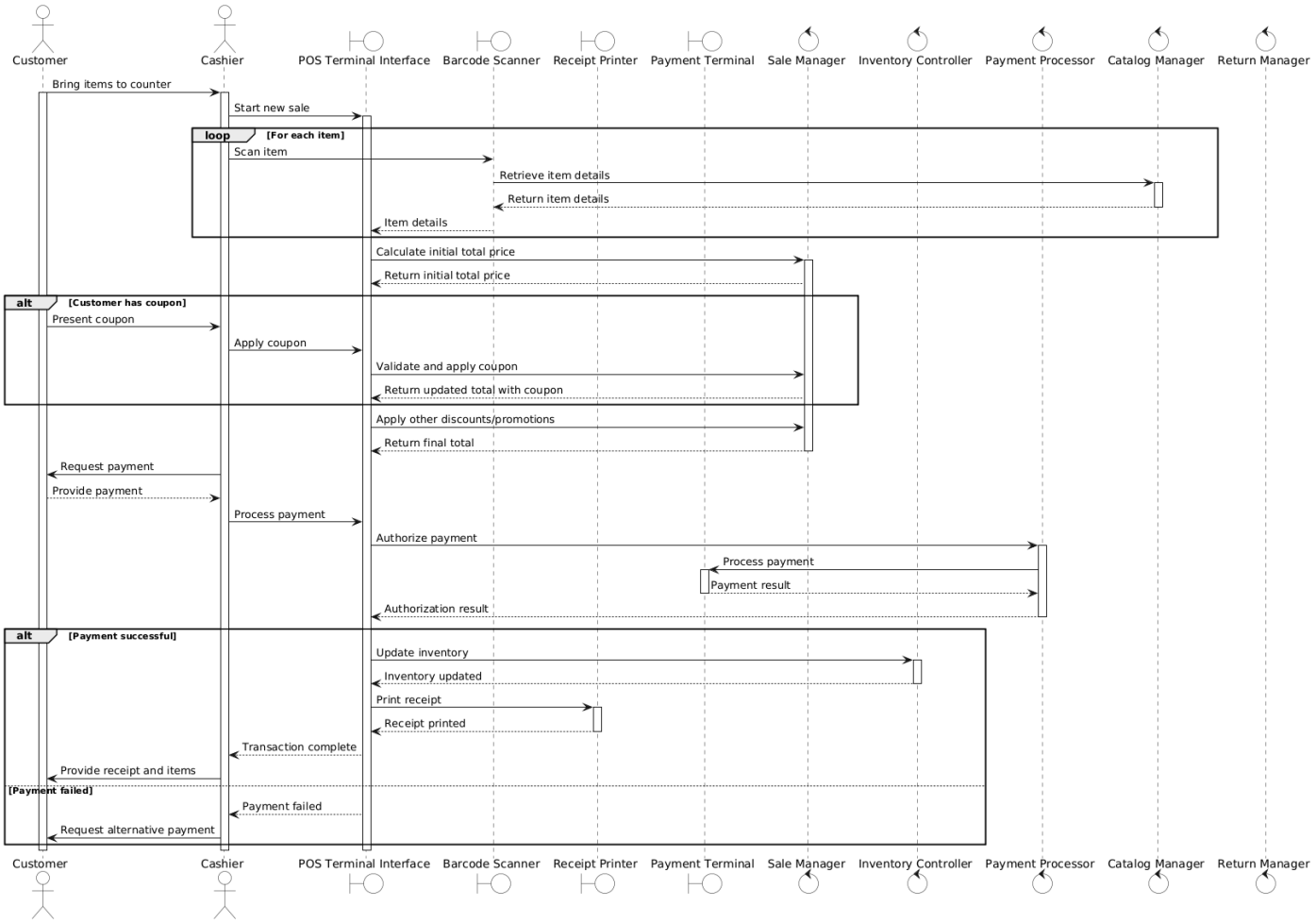
1. POS Terminal Interface
2. Barcode Scanner
3. Receipt Printer
4. Payment Terminal

Control Objects:

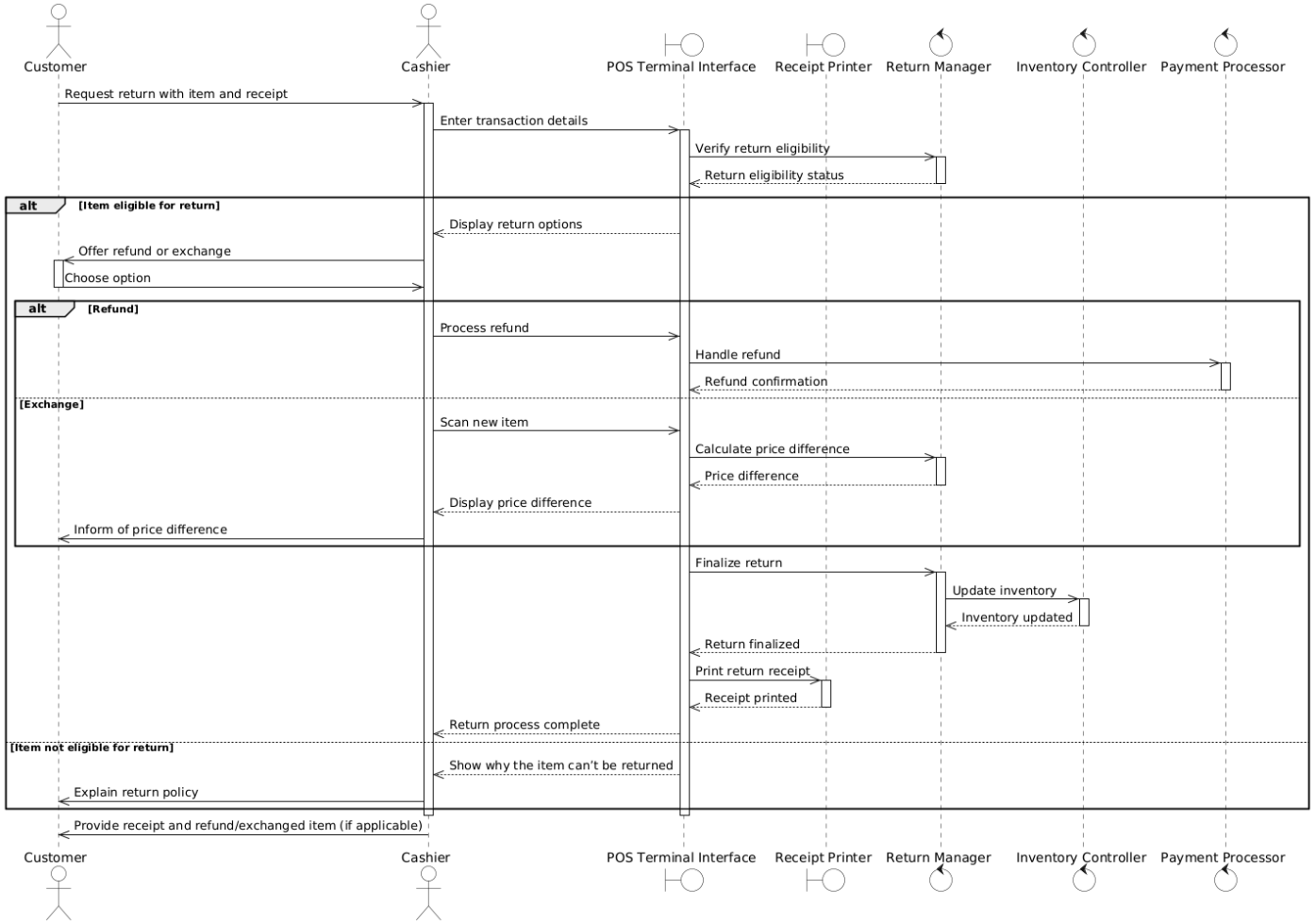
1. Sale Manager
2. Inventory Controller
3. Payment Processor
4. Catalog Manager
5. Return Manager

3. Develop Sequence Diagrams

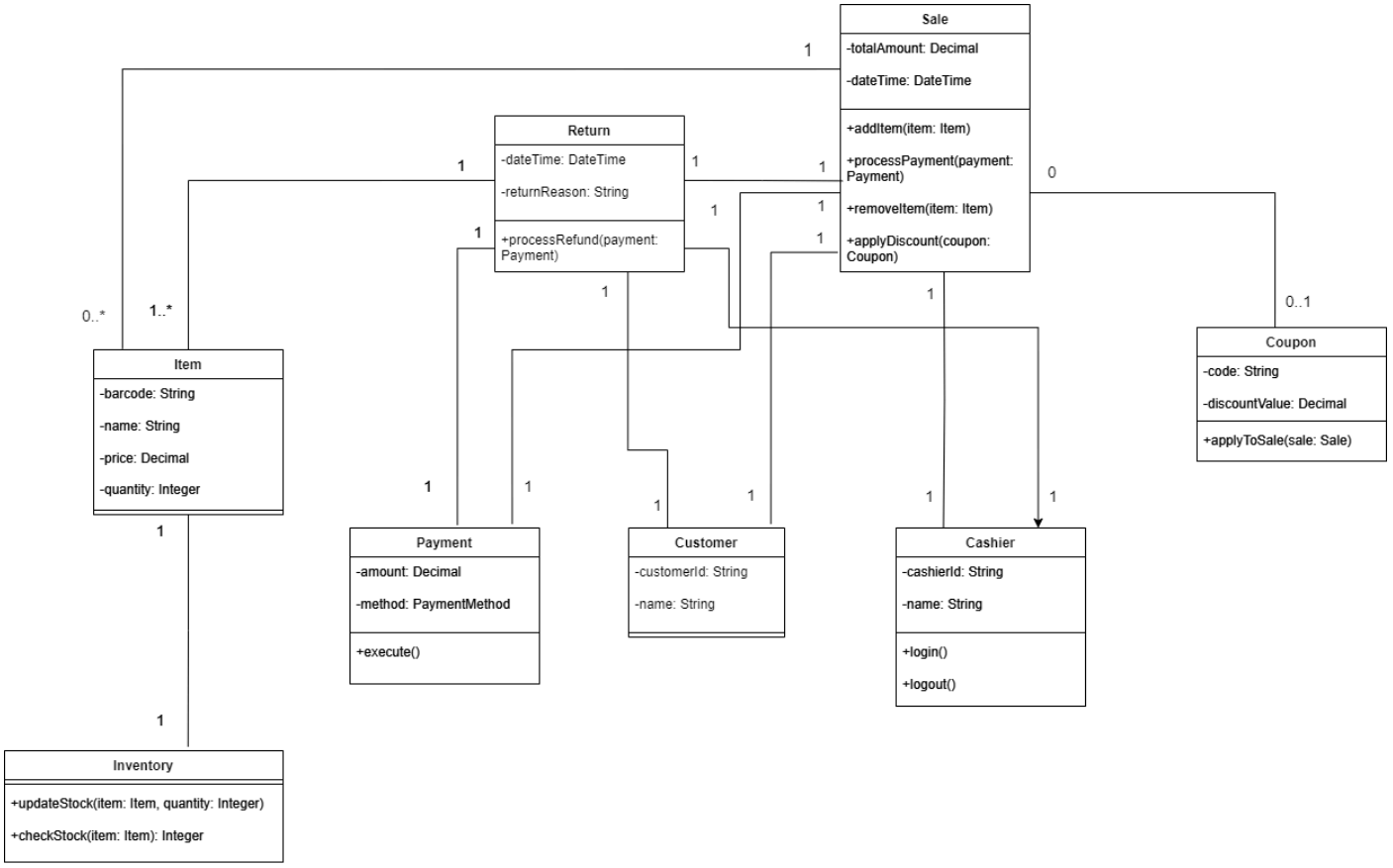
- **For Process sale**



- **For Handle return**

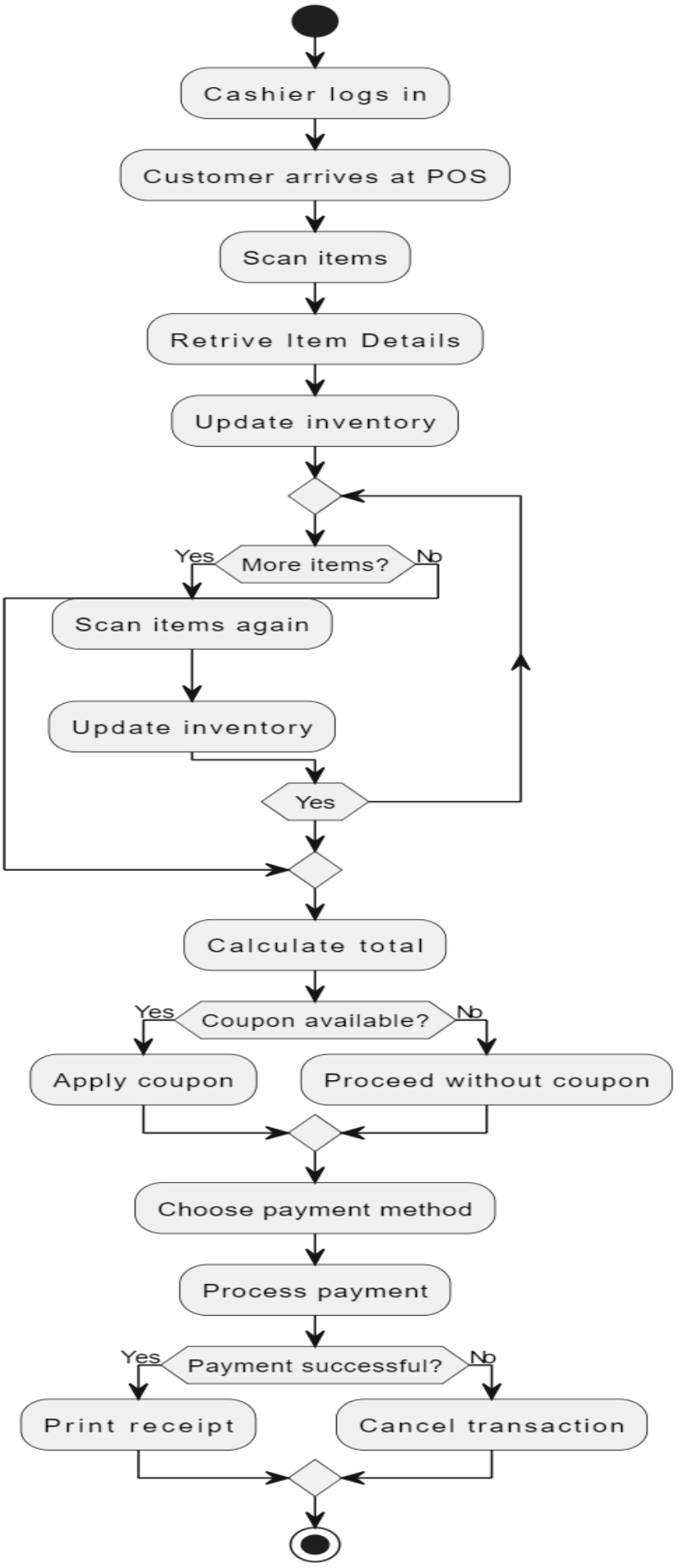


4. Develop Analysis Domain Models



5. Develop activity diagrams for "Process Sale" and "Handle Return" use cases.

- **For Process sale**



- **For Handle return**